

TEST SERIES CSIR-UGC-NET/JRF Dec. 2016

BOOKLET SERIES **B**

Paper Code **01**

Test Type: **TEST SERIES**

CHEMICAL SCIENCES

Duration: 2:00 Hours

Date: 27-11-2016

Maximum Marks: 220

Read the following instructions carefully:

* Single Paper Test is divided into TWO Parts.

Part - A: This part shall carry 30 questions. Each question shall be of 2 marks.

Part - B: This part shall contain 40 questions. Each question shall be of 4 marks.

* Darken the appropriate bubbles with HB pencil/Ball Pen to write your answer.

* There will be negative marking @25% for each wrong answer.

* The candidates shall be allowed to carry the Question Paper Booklet after completion of the exam.

* For rough work, blank sheet is attached at the end of test booklet.



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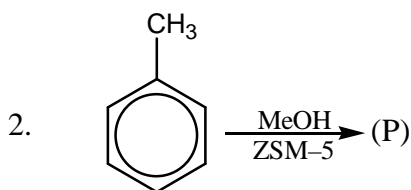
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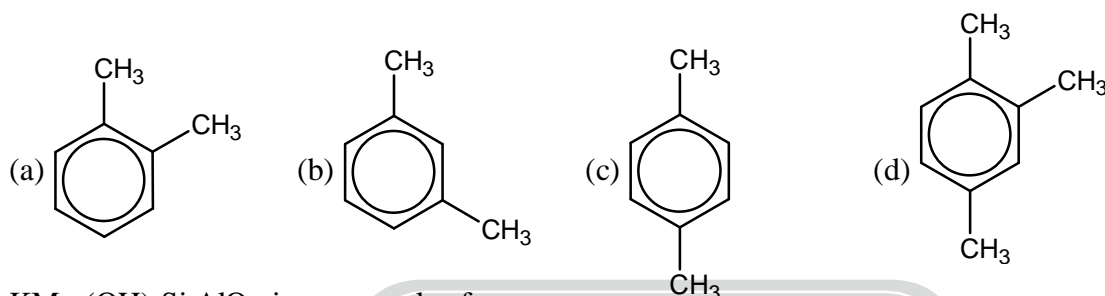
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PART-A

1. ^{11}B NMR spectrum of $[\text{HAl}(\text{BH}_4)_2]_2$ show a binomial quintet. The number of $3\text{c}-2\text{e}^-$ bond in dimer is
 (a) 8 (b) 10 (c) 12 (d) 6



The major product (P) is



3. $\text{KMg}_3(\text{OH})_2\text{Si}_3\text{AlO}_{10}$ is an example of
 (a) Tecto silicates (b) Amphiboles (c) Phyllosilicates (d) Nesosilicates
4. How many years will be taken by radioactive substance to remain $\frac{1}{8}$ th of its original amount if half life is 13 years
 (a) 26 (b) 48 (c) 52 (d) 39
5. Nuclide used to detect brain tumours and thyroid defects is
 (a) $^{131}\text{I}_{53}$ (b) $^{60}\text{Co}_{27}$ (c) $^{24}\text{Na}_{11}$ (d) $^{14}\text{C}_6$
6. In gas chromatography the basis for separation of the components of the volatile material is the difference in
 (a) Molecular weight (b) Partition coefficients
 (c) Molarity (d) Conductivity
7. Plastocyanin having which central atom with geometry
 (a) Cu, tetrahedral (b) Fe, octahedral (c) Fe, tetrahedral (d) Cu, pseudotetrahedral
8. The support useful in TLC are
 (a) silicagel (b) alumina (c) cellulose (d) all
9. Which of the following elements used for the γ -rays source in Mössbauer spectroscopy
 (1) Fe (2) CO (3) Mn (4) Mo
 (a) 1, 2 (b) 2, 3, 4 (c) 1, 3, 4 (d) all
10. The experimental and calculated values of magnetic moments of CoCl_4^{2-} are 4.50 B.M. and 3.87 B.M. respectively. The higher value of value of experimental magnetic moment is due to
 (a) orbital contribution (b) temperature independent paramagnetism
 (c) orbital quenching (d) none
11. The number of stereoisomers for $[\text{Co}(\text{en})_2(\text{NH}_3)\text{Cl}]^{2+}$ are
 (a) 2 (b) 3 (c) 4 (d) 5

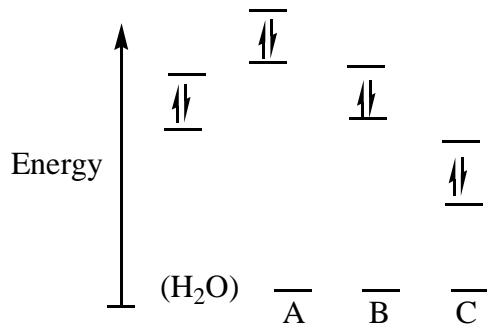
12. When iodine is dissolved in 60% Oleum ($\text{SO}_3 \mid \text{H}_2\text{SO}_4$) a deep blue species A is generated. The correct statement regarding species A is
 (I) I-I bond length in A is smaller than I_2
 (II) A is paramagnetic in nature
 (III) On cooling A converted to diamagnetic red species
 (IV) I-I bond length is longer in A than I_2
 (a) I, II and III (b) II, III and IV (c) I and III (d) II and IV
13. Stereochemically inactivity of lone pair in complex
 (I) increases with increase in number of ligand
 (II) increase with increase in molecular weight of central atom
 (III) increases with increase in electronegativity of ligand
 (IV) decreases with increase in electronegativity
 (a) I, II, III (b) I, II and IV (c) I and III (d) II and IV
14. The correct order of energies of d-orbital in square-antiprismatic complex is
 (a) $d_{z^2} > d_{xz} \approx d_{yz} > d_{x^2-y^2} \approx d_{xy}$ (b) $d_{xz} \approx d_{yz} > d_{z^2} > d_{x^2-y^2} \approx d_{xy}$
 (c) $d_{xz} \approx d_{yz} > d_{x^2-y^2} \approx d_{xy} > d_{z^2}$ (d) $d_{x^2-y^2} \approx d_{xy} > d_{z^2} > d_{xz} \approx d_{yz}$
15. Select the correct option in the following complexes, regarding the (CO) stretching frequency
 (I) $\text{TiO}_2(\text{PEt}_3)_2(\text{CO})_2 > \text{Cp}_2\text{Ti}(\text{CO})_2$
 (II) $\text{Rh}(\text{CO})_2[\text{P}(\text{OPh})_3]_2 < \text{Rh}(\text{CH}_3)_2(\text{CO})\text{dmp}$
 (III) $(\eta^3\text{-allyl})\text{Co}[\text{P}(\text{OMe})_3](\text{CO})_2 > (\eta^3\text{-1,3-dimethyl allyl})(\text{Co}(\text{PMe}_3)(\text{CO})_2)$
 (IV) $\text{Os}(\text{CF}_3)_2(\text{CO})_2[\text{P}(\text{OMe})_3]_2 < \text{Fe}(\text{CH}_3)_2(\text{CO})_2(\text{PMe}_3)_2$
 (a) I, II (b) I, III (c) III, IV (d) II, IV
16. Arrange the following compounds in the increasing order of ethylene C-C bond length.
- (A) (B) (C) (D)
- (a) $\text{D} > \text{C} > \text{B} > \text{A}$ (b) $\text{A} > \text{B} > \text{C} > \text{D}$ (c) $\text{D} > \text{C} > \text{A} > \text{B}$ (d) $\text{C} > \text{D} > \text{B} > \text{A}$
17. The number of P=O and P-O-P bond in P_4O_8 respectively are
 (a) 1 and 7 (b) 2 and 6 (c) 3 and 5 (d) 4 and 4
18. Select the correct order of thermal stability from following
 (a) $\text{PH}_4\text{I} > \text{PH}_4\text{Br} > \text{PH}_4\text{Cl} > \text{PH}_4\text{F}$ (b) $\text{PH}_4\text{F} > \text{PH}_4\text{Cl} > \text{PH}_4\text{Br} > \text{PH}_4\text{I}$
 (c) $\text{PH}_4\text{F} > \text{PH}_4\text{Br} > \text{PH}_4\text{Cl} > \text{PH}_4\text{I}$ (d) $\text{PH}_4\text{F} > \text{PH}_4\text{I} > \text{PH}_4\text{Br} > \text{PH}_4\text{Cl}$
19. Non-essential elements in the following
 (a) Cr, Ti, Zr (b) Al, Mn, Ni (c) Ti, Co, Mo (d) Al, Ti, Zr
20. The correct order of second ionization potential of carbon, nitrogen, oxygen and fluorine is:
 (a) $\text{C} > \text{N} > \text{O} > \text{F}$ (b) $\text{O} > \text{N} > \text{F} > \text{C}$
 (c) $\text{O} > \text{F} > \text{N} > \text{C}$ (d) $\text{F} > \text{O} > \text{N} > \text{C}$

21. The ESR spectrum of $[\text{Cu}(\text{en})_2]^{2+}$ exhibits
- [Given : $I_{\text{Cu}} = \frac{3}{2}$, $I_{\text{N}} = 1$]
- (a) 36 fine lines (b) 36 hyperfine lines (c) 45 fine lines (d) 60 hyperfine line
22. The number of Mössbauer lines in the presence and absence of magnetic field respectively for $\text{K}_2[\text{Fe}(\text{CN})_5\text{NO}]$
- (a) 6 and 1 (b) 6 and 2 (c) 2 and 6 (d) 1 and 6
23. The intense red color of an $[\text{Fe}(\text{phen})_3]^{2+}$ solution is replaced by pale blue when cerium (IV) sulfate is added to its. The colour of reactant and product is due to respectively
- (a) d-d transition in both
 (b) MLCT in reactant while LMCT in product
 (c) MLCT in reactant and d-d transition in product
 (d) d-d transition in reactant while MLCT in product
24. Correct statement for oxyhemerythrin is
- (a) both the Fe are same (b) oxyhemerythrin is paramagnetic in nature
 (c) O_2 is present as HO_2^- (d) it is colourless
25. The series with the correct order of decreasing ionic size is:
- (a) $\text{K}^+ > \text{Ca}^{2+} > \text{S}^{2-} > \text{Cl}^-$ (b) $\text{S}^{2-} > \text{Cl}^- > \text{K}^+ > \text{Ca}^{2+}$
 (c) $\text{K}^+ > \text{Cl}^- > \text{Ca}^{2+} > \text{S}^{2-}$ (d) $\text{Cl}^- > \text{K}^+ > \text{S}^{2-} > \text{Ca}^{2+}$
26. For an odd nucleon in 'f' nuclear orbital and parallel to I spin and parity are
- (a) $\frac{7}{2}$ and (+) (b) $\frac{7}{2}$ and (-) (c) $\frac{9}{2}$ and (+) (d) $\frac{9}{2}$ and (-)
27. Which of following oxides have highest Neel temperature
- (a) MnO (b) NiO (c) FeO (d) CoO
28. Which follow correct order of dipole moment
- (I) $\text{I}_2-\text{C}_6\text{H}_6$ (II) I_2 -pyridine (III) I_2 -dioxan
- (a) $\text{I} < \text{II} < \text{III}$ (b) $\text{I} < \text{III} < \text{II}$ (c) $\text{I} > \text{II} > \text{III}$ (d) $\text{I} > \text{III} > \text{II}$
29. For the complexes $[\text{Co}(\text{en})_3]^{3+}$ and $[\text{CoF}_6]^{3-}$ Δ_0 values are 23000 cm^{-1} and 13000 cm^{-1} respectively. The CFSE value for $[\text{Co}(\text{en})_2\text{F}_2]^+$ is:
- (a) -48000 cm^{-1} (b) -8000 cm^{-1}
 (c) 432000 cm^{-1} (d) 7200 cm^{-1} .
30. Solubility of CrCl_3 in aqueous media is enhanced by addition of some amount of CrCl_2 or SnCl_2 , this is due to
- (a) outer sphere mechanism (b) inner sphere mechanism
 (c) CrCl_2 is more soluble than CrCl_3 (d) none of the above.

PART-B

31. Correct set of log k for the formation of the complexes $[M(\text{crypt-222})]^{n+}$
- (I) $\text{Ba}^{2+} > \text{Sr}^{2+} > \text{Ca}^{2+} > \text{Mg}^{2+}$ (II) $\text{K}^+ > \text{Rb}^+ > \text{Na}^+ > \text{Li}^+$
 (III) $\text{Na}^+ > \text{K}^+ > \text{Rb}^+ > \text{Li}^+$ (IV) $\text{Sr}^{2+} > \text{Ba}^{2+} > \text{Ca}^{2+} > \text{Mg}^{2+}$
 (a) II and IV (b) I and II (c) I and III (d) III and IV
32. Number of framework electron and possible isomers in carboranes $\text{C}_2\text{B}_5\text{H}_7$ respectively are
 (a) 16 and 4 (b) 16 and 3 (c) 14 and 3 (d) 14 and 4
33. A radioactive substance after two hours remains $\frac{1}{16}$ th of its original amount $t_{1/2}$ in minute of this substance will be
 (a) 30 minutes (b) 60 minutes (c) 75 minutes (d) 120 minutes
34. In the following radioactive decay,
- $${}_{92}^{232}\text{X} \longrightarrow {}_{89}^{220}\text{Y}$$
- How many α and β particles are emitted from X to form Y
 (a) $3\alpha, 5\beta$ (b) $5\alpha, 5\beta$ (c) $3\alpha, 3\beta$ (d) $5\alpha, 3\beta$
35. Number of signals observed for the complex $\text{Fe}_3(\text{CO})_{12}$ in M.B. spectroscopy
 (a) 2 (b) 3 (c) 1 (d) 4
36. Which of the following pairs represent the labile and inert complexes respectively
 (a) $[\text{Mn}(\text{CN})_6]^{3-}$ and $[\text{Fe}(\text{CN})_6]^{3-}$ (b) $[\text{Co}(\text{CN})_6]^{3-}$ and $[\text{Fe}(\text{CN})_6]^{4-}$
 (c) $[\text{Cr}(\text{CN})_6]^{3-}$ and $[\text{Ti}(\text{CN})_6]^{3-}$ (d) $[\text{Ni}(\text{CN})_4]^{2-}$ and $[\text{Cr}(\text{CN})_6]^{3-}$
37. Electrophilic substitution reaction of terminal H atom attached to B in closo-1, 2 $\text{C}_2\text{B}_{10}\text{H}_{12}$ follow the sequence
 (a) $8, 10 > 4, 5, 7, 11 > 9, 12 > 3, 6$ (b) $(8, 10 \approx 9, 12) > 4, 5, 7, 11 > 3, 6$
 (c) $3, 6 > 4, 5, 7, 11 > 8, 10 \approx 9, 12$ (d) $4, 5, 7, 11 > 3, 6 > 8, 10 \approx 9, 12$
38. $\text{M} + \text{graphite} \longrightarrow \text{M-graphite}$, where M = Alkali metal (P)
 The correct statement regarding P is/are
 (I) electrical conductivity decreases with increase in temperature
 (II) M-graphite compounds are coloured.
 (III) Mechanism of conductivity in M-graphite complexes are similar to conductivity in n-type semiconductors.
 (IV) In product planarity and delocalization of layers are retained.
 (a) I, II, IV (b) I, II, III, IV (c) I, II and III (d) II, III, IV
39. Choose the correct option in following
 (I) Bronsted acidity : $\text{SnH}_4 > \text{SbH}_3 > \text{TeH}_2$
 (II) Bronsted basicity : $\text{NH}_3 > \text{PH}_3 > \text{SbH}_3$
 (III) Basicity to H^+ (gas phase)
 $\text{N}(\text{CH}_3)_3 > \text{NH}(\text{CH}_3)_2 > \text{NH}_2(\text{CH}_3) > \text{NH}_3$
 (IV) Basicity to BMe_3
 $\text{Pyridine} > \text{-2-methyl pyridine} > \text{4-methyl pyridine}$
 (a) I, III (b) II, III (c) II, IV (d) I, IV

40. The correct order of $\bar{\nu}$ (cm^{-1}) for different term of dioxygen is
- (a) ${}^1\Delta_g > {}^1\Sigma_g^+ > {}^3\Sigma_g^- > {}^3\Sigma_u^-$ (b) ${}^3\Sigma_g^- > {}^1\Delta_g > {}^1\Sigma_g^+ > {}^3\Sigma_u^-$
 (c) ${}^3\Sigma_g^- > {}^1\Delta_g > {}^3\Sigma_u^- > {}^1\Sigma_g^+$ (d) ${}^3\Sigma_g^- > {}^3\Sigma_u^- > {}^1\Delta_g > {}^1\Sigma_g^+$
41. Consider the following energy level diagram



Correct statement about H_2O is/are

- (I) H_2O with A behave as oxidizing agent
 (II) H_2O with B behave as acid and base with C
 (III) H_2O with C behave as acid and with C as oxidising agent
 (IV) H_2O with all behave as base
- (a) I, II, III (b) II, III (c) II and IV (d) I and II
42. The solution ${}^{31}\text{P}$ NMR spectrum of a mixture of isomer of square planar complex $[\text{Pt}(\text{SCN})_2(\text{Ph}_2\text{PCH}_2\text{PPh}_2)_2]$ show one broad signal at 298K. At 298K, two singlet and two doublet are observed. The number of possible isomer complex is
- (a) 3 (b) 4 (c) 6 (d) 2
43. $\text{M}^{2+} \longrightarrow \text{M}^{3+} + \text{e}^- \quad I_3 = +ve$
 Consider the above process select the correct statement
- (a) Cr^{2+} is stronger reducing agent than V^{2+} in gaseous as well as in aqueous medium
 (b) V^{2+} is stronger reducing than Cr^{2+} in gaseous as well as as aqueous medium
 (c) Cr^{2+} is weaker reducing agent than V^{2+} in gaseous while stronger in aqueous medium.
 (d) V^{2+} is weaker reducing than Cr^{2+} gaseous and stronger in aqueous medium.
44. Select the correct statement regarding $\text{Na}_3\text{P}_3\text{O}_{10}$ and $\text{Na}_6\text{P}_4\text{O}_{13}$
- (I) both give two ${}^{31}\text{P}$ NMR signal
 (II) $\text{Na}_3\text{P}_3\text{O}_{10}$ have two signal of intensity 2 : 1
 (III) $\text{Na}_6\text{P}_4\text{O}_{13}$ has two signal of equal intensity
 (IV) $\text{Na}_3\text{P}_3\text{O}_{10}$ show two while $\text{Na}_6\text{P}_4\text{O}_{13}$ shows four ${}^{31}\text{P}$ NMR signal.
- (a) IV only (b) I, II and III (c) I and II (d) I and III
45. Consider the following reaction,
- $$\text{XeF}_2 + \text{SbF}_5 \longrightarrow \text{P}$$
- Correct statement regarding above are
- (1) HOMO in XeF_2 and in P containing Xe-F compound is non-bonding
 (2) On going from XeF_2 to product Xe-F bond order increases
 (3) On going from XeF_2 to product Xe-F bond order decreases
 (4) Product P exist as ion pair.
- (a) 1, 3, 4 (b) 1, 2, 4 (c) 1 and 2 (d) 1 and 3

46. Match the correct entities in the following regarding metal, related compounds and their action respectively

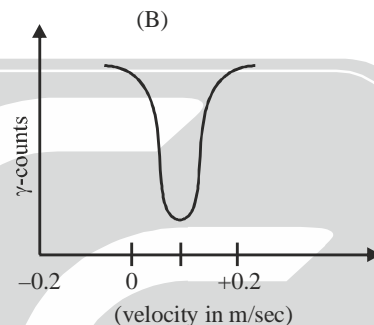
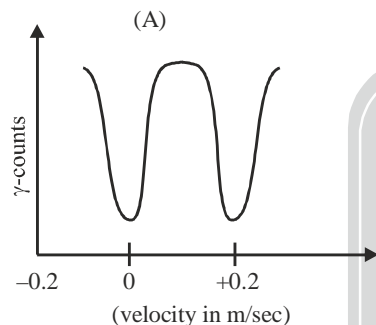
(I) Fe	Siderophores	Iron transport
(II) Ni	Urease	Hydrolysis of urea into CO_2 and NH_3
(III) Cu	Hemocyanin	Electron transfer
(IV) Fe	Ferritin	Iron storage
(a) I, III, IV	(b) II, III, IV	(c) I, II, IV
		(d) II, III, IV

47. Match the following

(1) Ferredoxin	(P) storage of iron
(2) Hemerythrin	(Q) oxygen transport
(3) Catalase	(R) electron transfer
(4) Ferritin	(S) decomposition of H_2O_2
(5) Myoglobin	(T) oxygen storage
(a) 1-Q, 2-S, 3-T, 4-R, 5-P	(b) 1-R, 2-Q, 3-S, 4-P, 5-T
(c) 1-R, 2-P, 3-T, 4-Q, 5-S	(d) 1-Q, 2-R, 3-T, 4-S, 5-P

48. The Mossbauer spectra of two iron complexes are shown below. They may arise from

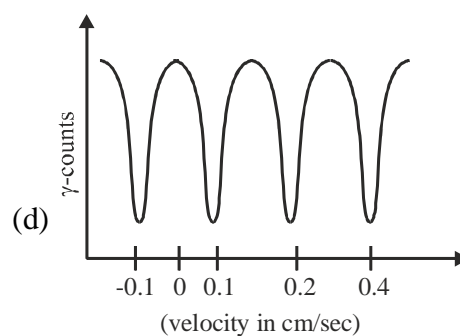
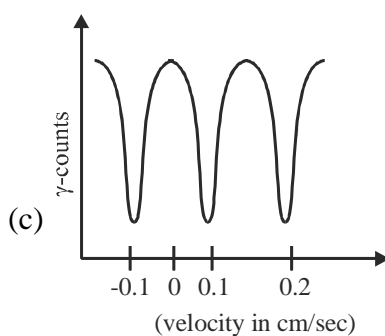
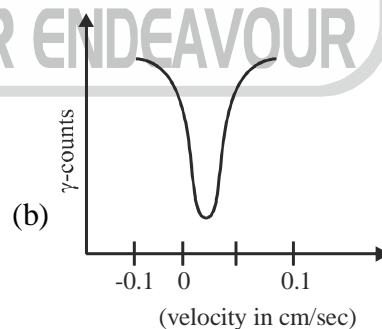
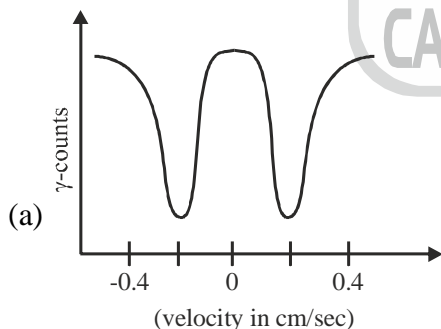
- (1) high-spin iron (III) (2) high-spin iron (II) (3) low-spin iron (III)



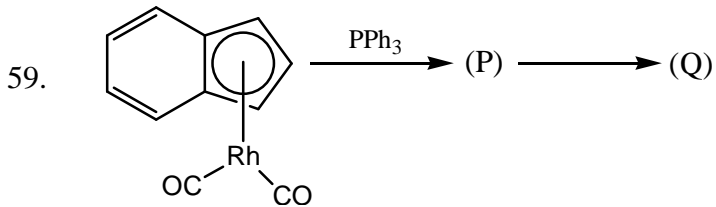
The incorrect match of spectra (A) and (B) with iron complexes are

- (I) A with (1) and B with (2) (II) A with (2) and B with (1)
 (III) A with (3) and B with (2) (IV) A with (2) and B with (3)
 (a) II (b) I, III, IV (c) none of these (d) all

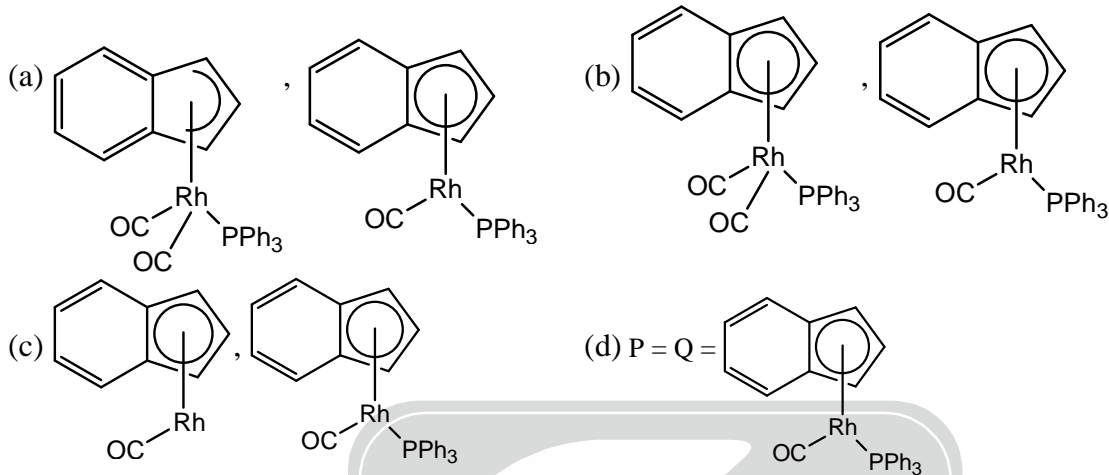
49. The correct MB spectrum of $\text{Fe}(\text{CO})_5$ at liquid nitrogen temperature



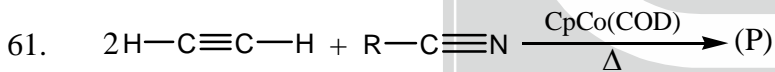
50. Which of the following statements is/are correct
 (a) the gas chromatography analysis of drugs and their metabolites in body fluids frequently require considerable sample cleanup
 (b) gas chromatographic methods are generally not applicable to highly polar substances
 (c) gas chromatographic methods are not applicable for the analysis of substance of high molecular weight.
 (d) all are correct.
51. Red and yellow isomers exist for the coordination complex $[\text{Co}(\text{NH}_3)_5\text{NO}_2]^{2+}$. If the red isomer has ν_{NO} bands at 1470 and 1065 cm^{-1} and the yellow isomer has ν_{NO} band at 1430 and 1310 cm^{-1} . What will be the coordination mode of NO_2 .
 (a) Yellow $\text{Co}-\text{ONO}$ red $\text{Co}-\text{NO}_2$
 (b) Yellow $\text{Co}-\text{NO}_2$ red $\text{Co}-\text{ONO}$
 (c) Red $\text{Co}-\text{NO}_2$ yellow $\text{Co}-\text{NO}_2$
 (d) Red $\text{Co}-\text{ONO}$ yellow $\text{Co}-\text{ONO}$
52. Which of the following pairs match the correct ν_{NO} (cm^{-1}) frequencies?
 (A) $\text{N} \equiv \text{O}^+$ (1) 1880
 (B) NO (2) 886
 (C) NO^- (3) 1366
 (D) NO^{2-} (4) 2273
 (a) A-1, B-2, C-3, D-4 (b) A-4, B-1, C-3, D-2
 (c) A-2, B-4, C-3, D-1 (d) A-3, B-4, C-1, D-2
53. The crystal field stabilization energy (CFSE) value for $[\text{Co}(\text{NH}_3)_6]^{3+}$ that has an absorption maximum at 690 nm
 (a) 415.56 kJ/mole (b) 69.260 kJ/mole (c) 455.56 kJ/mole (d) 84.26 kJ/mole
54. The ground state term and the magnetic moment of the Ho^{3+} ion is
 (a) ^5H and 10.60 B.M. (b) ^6I and 4.9 B.M.
 (c) ^5I and 10.60 B.M. (d) ^5I and 4.9 B.M.
55. The order of separation of tripositive lanthanide ions is
 (a) $\text{Ce}^{3+}, \text{Nd}^{3+}, \text{Eu}^{3+}, \text{Er}^{3+}, \text{Yb}^{3+}$ (b) $\text{Yb}^{3+}, \text{Er}^{3+}, \text{Eu}^{3+}, \text{Nd}^{3+}, \text{Ce}^{3+}$
 (c) $\text{Nd}^{3+}, \text{Eu}^{3+}, \text{Er}^{3+}, \text{Yb}^{3+}, \text{Ce}^{3+}$ (d) $\text{Ce}^{3+}, \text{Nd}^{3+}, \text{Er}^{3+}, \text{Eu}^{3+}, \text{Yb}^{3+}$
56. Total number of expected ESR lines for NH_2 radical will be
 [Given : $A_{\text{N}} = 30.0 \text{ mT}$ and $A_{\text{H}} = 15.0 \text{ mT}$]
 (a) 5 lines (b) 9 lines (c) 7 lines (d) 10 lines
57. Correct statement regarding uranium is
 (1) most stable oxidation state of uranium is +6
 (2) in uranocene its oxidation state is +4
 (3) in UO_2^+ colour is due to LMCT
 (4) Electronic configuration of uranium corresponds $(\text{Rn})5f^3 6d^1 7s^2$
 (a) 1, 2 (b) 1, 2, 4 (c) 1, 2, 3, 4 (d) 2, 3, 4
58. Among $(\text{CH}_3)_3\text{N}-\text{SO}_3$ and $\text{H}_3\text{N}-\text{SO}_3$, correct statement is
 (a) S-N bond length in first is greater than II
 (b) N-S-O bond angle in I is less than II
 (c) N-S bond length in I is smaller than II and N-S-O bond angle in I is larger than II
 (d) none of these



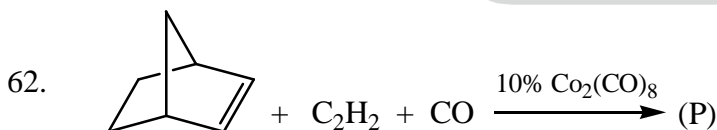
The intermediate P and the product Q are respectively



60. The structure of the cluster anion $[\text{HCo}_6(\text{CO})_{15}]^-$ in the crystal shows Co_6 octahedron holds ten terminal CO ligand, four unsymmetrical CO bridges and one symmetrical 'CO' bridges. The H-atom readily leaves the center of Co_6 octahedron as the pH value increases. The ^1H NMR of this cluster shows chemical shift at
 (a) +23 ppm (b) -7.5 (c) -19.5 (d) 2.90 ppm



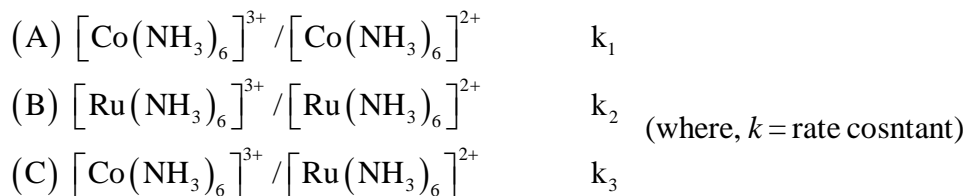
The major product (P) in the above reaction is



The major product (P) in the above reactions



63. Consider the following electron transfer process



Select the correct statement regarding above reaction

- (a) $k_2 > k_1 > k_3$ (b) $k_1 > k_2 > k_3$ (c) $k_2 > k_3 > k_1$ (d) $k_1 > k_3 > k_2$

64. Consider the following

Volumetric Method for Ag (I)	Indicator used
(i) Fajans method	Chromate
(ii) Mohr's method	Fluorescein
(iii) Vohlard method	Ferric salt

The method and indicator matched correctly is

- (a) I and II only (b) II and III only (c) III only (d) II only

65. The shape and the coordination number of $[\text{Nd}(\text{H}_2\text{O})_9]^{3+}$ is

- (a) tri-capped trigonal prism, 9 (b) mono-capped trigonal prism, 9
(c) Dodecahedral, 8 (d) Icosahedral, 10

66. Δ_0 value for ML_8 cubane like structure is

- (a) equal to Δ_0 (b) $\frac{4}{9}\Delta_t$
(c) greater than Δ_0 (d) less than Δ_0

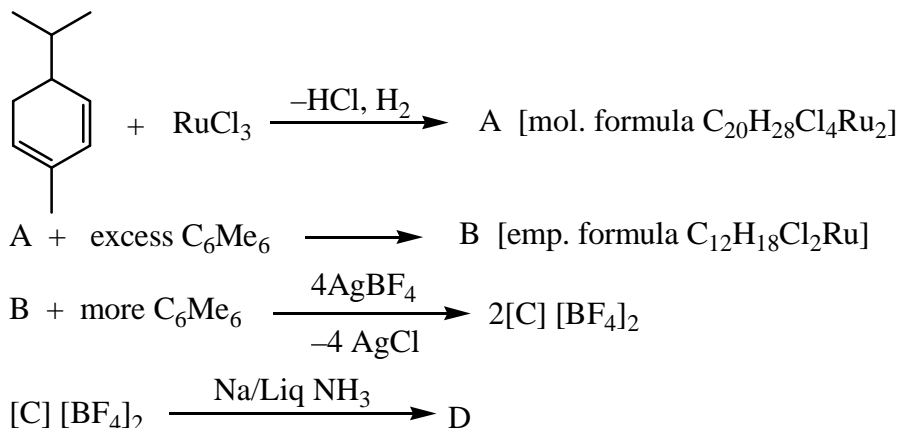
67. The ground state terms for H_2^+ and NO are respectively.

- (a) $^2\Sigma_g$ and $^3\Sigma_g$ (b) $^2\Sigma_g$ and $^2\pi_g$ (c) $^3\Sigma_g$ and $^2\pi_u$ (d) $^3\Sigma_g$ and 2E_g

68. Which is incorrect statements among

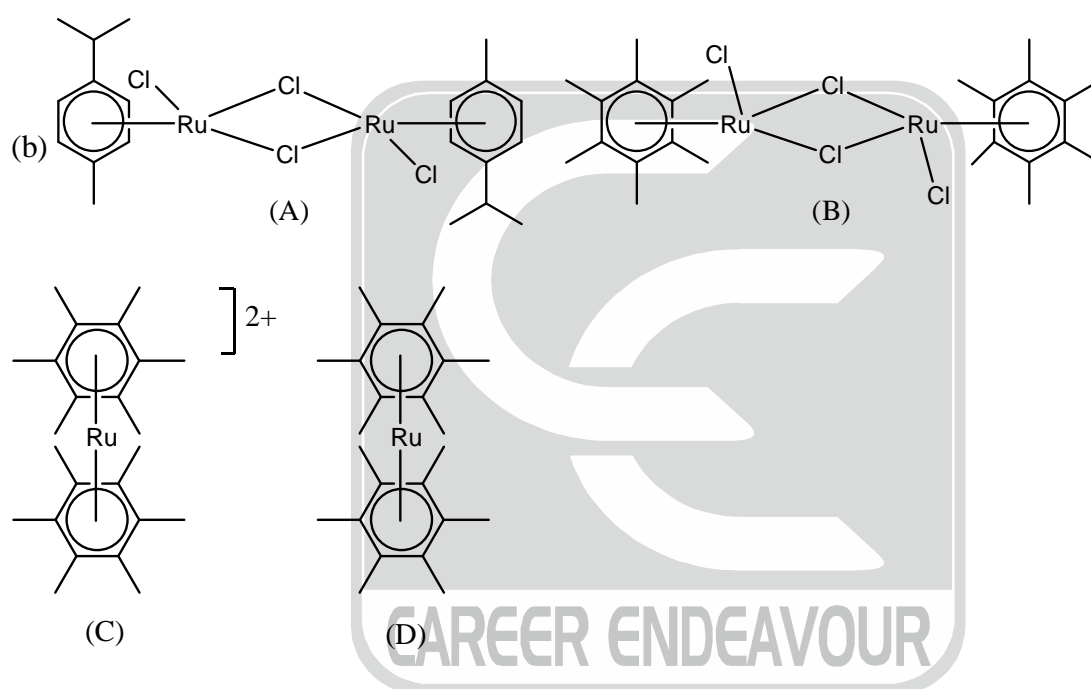
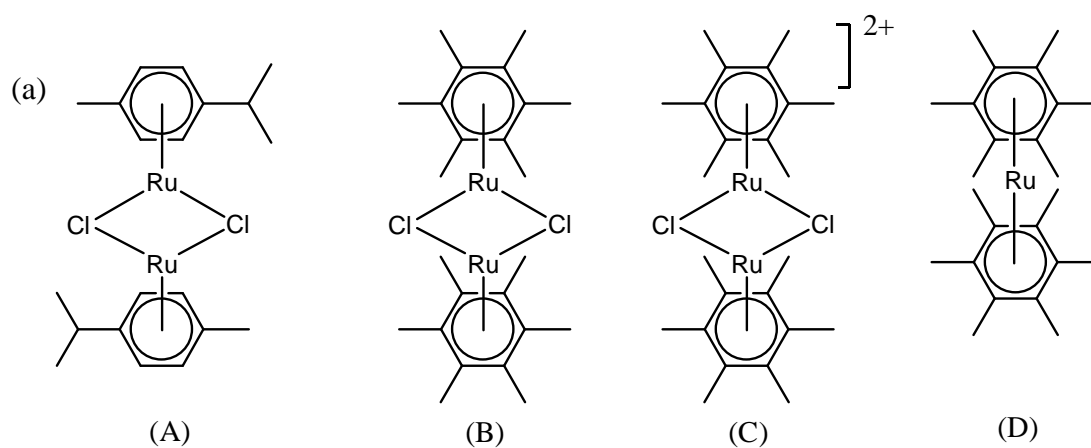
- (a) The rate of hydrolysis follows order $\text{trans}-[\text{Cr}(\text{NCS})_4(\text{NH}_3)_2]^\ominus < \text{trans}-[\text{Cr}(\text{NCS})_4(\text{ND}_3)_2]^\ominus$
(b) ortho- D_2 is stable form at low temperature
(c) para- H_2 is stable form at low temperature
(d) para- T_2 is less stable than ortho- T_2 at low temperature

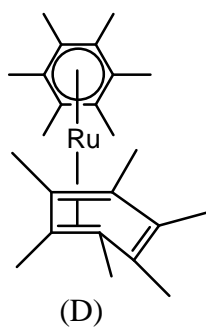
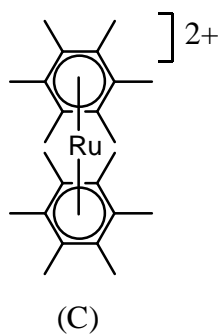
69. Consider the following reaction scheme.



The compound C and D are monomeric and do not contain chlorine and D is a neutral molecule. The com-

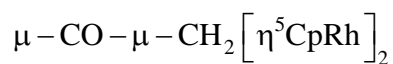
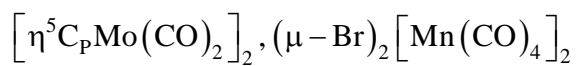
Compound A \rightarrow D obey the 18 electron rule and they all have at least one η^6 -coordinated ligand on ruthenium. So, on the basis of above information find structure of A \rightarrow D respectively.





(d) None of these

70. The total number of M–M bond in the given organometallic compounds are respectively



(a) 0, 3, 2

(b) 3, 0, 2

(c) 1, 2, 3

(d) 3, 0, 1



Space for rough work



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ANSWER KEY

PART-A

1. (b)	2. (c)	3. (c)	4. (d)	5. (a)	6. (b)	7. (d)
8. (d)	9. (b)	10. (b)	11. (b)	12. (a)	13. (b)	14. (c)
15. (b)	16. (c)	17. (b)	18. (a)	19. (d)	20. (c)	21. (b)
22. (b)	23. (c)	24. (c)	25. (b)	26. (b)	27. (b)	28. (b)
29. (a)	30. (b)					

PART-B

31. (b)	32. (b)	33. (a)	34. (c)	35. (a)	36. (d)	37. (b)
38. (b)	39. (b)	40. (b)	41. (d)	42. (a)	43. (c)	44. (b)
45. (b)	46. (c)	47. (b)	48. (b)	49. (a)	50. (d)	51. (b)
52. (b)	53. (a)	54. (c)	55. (b)	56. (c)	57. (c)	58. (c)
59. (a)	60. (a)	61. (b)	62. (c)	63. (c)	64. (c)	65. (a)
66. (d)	67. (b)	68. (d)	69. (c)	70. (b)		

